D101.22/3:
385-82

AMC Pamphlet
AMCP 385-82

SAFETY DIGEST

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WASHINGTON, D.C. 20310

16 February 1968

MEMORANDUM FOR: Safety Directors

SUBJECT: Reporting of Accidents to Department of Labor

1. The Secretary of Labor has requested that all Federal Agencies, including Department of Army, follow the provisions of the USA Standard Z16.1, American Standard Method of Recording and Measuring Work Injury Experience, and submit, beginning NLT 1 July 68, calendar year quarterly summaries of civilian accident experience to the Department of Labor for the Federal Safety Council. This is the first step in the establishment of uniform accident reporting procedures throughout the Federal government. All sections of the standard are applicable except those pertaining to severity and severity rates, and nonstandard measures.

2. We will comply with the request of the Secretary of Labor. Minor changes will be required in our regulation but our present system permits the submission of reports for 1st and 2nd quarter of CY '68 essentially in accordance with the Standard.

3. AR 385-40 will be rewritten to incorporate any changes made necessary by this request. It is not anticipated that significant changes will be required.

4. Copies of the Standard are available from

The United States of America Standards Institute
10 East 40th Street
New York, New York 10016

We recommend that you become familiar with it so that the minor changes required in our reporting system can be made smoothly and easily.

5. The Safety Division will prepare the reports for the Labor Department from the data routinely supplied by the major commands. No additional requirement will be placed on the major command reporting system.

T. H. WILKENSON
Director of Safety

D 101.22/2:385-82

USA standard

USAS
Z16.1-1967
Revision of
Z16.1-1964
(R1969)

Method of Recording and Measuring Work Injury Experience

HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

AMC Pamphlet 385-82 Mar 1968

The Safety Digest is an AMC Pamphlet prepared by the Safety Division, Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

(AMCAD-S)

*FOR THE COMMANDER:

CLARENCE J. LANG
Major General, USA
Chief of Staff

OFFICIAL:

STANLEY J. SAWICKI
Colonel, GS
Chief, Administrative Office

Special Distribution

IN THIS ISSUE

FOREWORD I
IN THIS ISSUE II

MOVE OUT OF THE ACCIDENT PHASE 1
TOOLE ARMY DEPOT QUALIFIES FOR NSC AWARD OF HONOR 2
GUIDE IMPROVES SAFETY COMMITTEE MEETING AND MINUTES 3
CHECKING FOR ELECTRICAL HAZARDS 4
PORTABLE DESK LAMP HAZARD 7
CURRENT EVENTS
- HABIT PLUS BLOCKED AISLE EQUAL ACCIDENT 8
- STOP! STOP! STOP! 8
- OVERDRESSING HAS ITS HAZARDS 9
- LOOK OUT AHEAD! 11
- INATTENTION YIELDS KING-SIZED HEADACHE 12

NOISY TOYS MAY IMPAIR HEARING 13
THIRTEEN WAYS TO AVOID SUDDEN DEATH 14
A LESSON LEARNED 15
EXPLOSIVES SAFETY
- SENSITIVITY OF METAL-HALOGENATED SOLVENT COMBINATIONS 16
- CONTROLLING STATIC ELECTRICITY DURING EXPLOSIVES OPERATIONS 22
- A MODERNIZED AMMUNITION MAINTENANCE FACILITY 24

ACCIDENT-FREE DRIVING AWARD PRESENTED BY CO, USAMER & DC 28
PLEXIGLAS - HANDLE WITH CARE 29
CG, TECOM PRESENTS AWARD OF HONOR FOR SAFETY TO PRESIDENT USA ARTILLERY BOARD 30
CRANE BOOM LOADING 31
MG LOLLIS CG, TACOM PRESENTS AMC AWARD OF MERIT TO CO, LIMA MODIFICATION CENTER 32
MG EIFLER, CG, MICOM PRESENTS AMC AWARD OF HONOR TO ROHM AND HAAS REDSTONE ARSENAL RESEARCH LABS 33
HUNTSVILLE DIVISION, THIOKOL CHEMICAL CORP. WINS AMC AWARD OF MERIT 33
SPRINGFIELD ARMORY RECEIVES AMC AWARD OF HONOR 34
AMC FY 1967 AWARD OF MERIT WON BY USA PEQUA 34
NSC AWARD OF HONOR WON BY ANNISTON AD 34
DO YOU KNOW? 35
PROSPECTIVE EMPLOYEE RECEIVES SAFETY MESSAGE 36
REFERENCE PUBLICATIONS 37
LETTERKENNY AD COMMENDED FOR PERFECT RECORDS 37
WELL, DID YOU KNOW? 38
SAFETY DIGEST INDEX 40
INSIDE FRONT COVER - REPORTING OF ACCIDENTS TO DEPARTMENT LABOR
FACING PAGE - NEW Z16.1 STANDARDS

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MOVE OUT OF THE ACCIDENT PHASE

Jody D. Meredith, Safety Assistant Trainee
U. S. Army Materiel Command Field Safety Agency

What are the chances that I may be injured due to carelessness of my friends and co-workers?

Whether you realize it or not, you have considered this question many times. You have also taken action based on your answer. For instance, you avoid riding with an acquaintenance who is a reckless driver.

The working career of an average employee can be broken into three phases. First, is the learner who is not sure of himself and who wants to do a good job. Second, is the overconfident worker who has temporarily passed beyond the stage of learning. The third is the man who has been through the mill and has awakened to the fact that his hastily conceived actions can endanger himself and others.

As an automobile driver, you have probably passed through the first two of these stages. At first you could not see how you would ever be able to control your car as well as other drivers around you. You finally earned your driver's license, and because it was such a prized trophy, you were going to do your very best to keep it.

Then you realized that little effort was required to operate the automobile. You were master of a machine which will go forward, back up, turn right or left, go slow or almost as fast as you dared to travel. You overlooked the fact you were a potential killer. It was up to the other guy to get out of the way.

You probably recall when you were fortunate enough to pass through the third-driver phase. The change could have been caused by a minor accident in which you were involved or a major one you witnessed. It may have been from a close call or even just growing up.

No matter what age a person starts working or driving, there should be some indication of the three-phased pattern.

As an employee, who is interested in safety, you can profit from giving the problem some deep thought. You may prevent the involvement of yourself and your fellow employees in accidents.

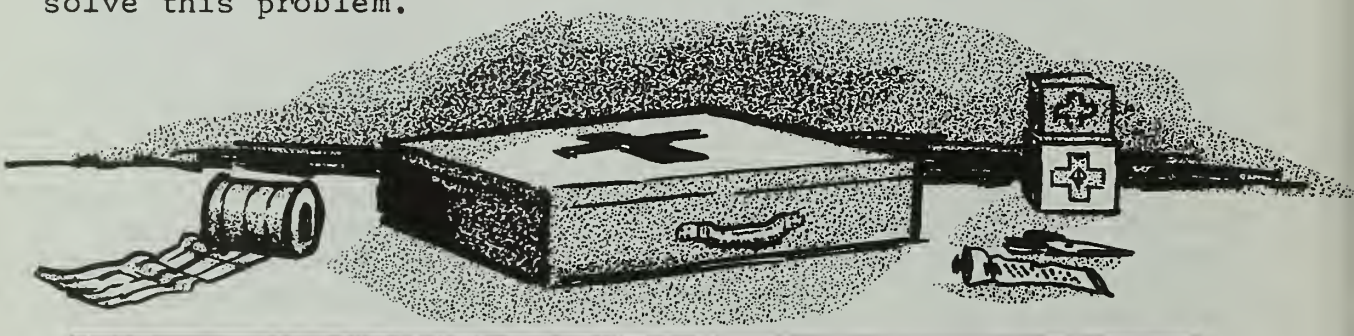
Take, for example, the worker who is beginning his first day on the job. He listens and watches intently those who instruct him in how his work should be accomplished. As he starts his probationary period, this person may be assigned to work with you because you are an experienced person and you can provide him with appropriate guidance.

After a while, this employee may change completely. He may become the sure-shot, the know-it-all, the guy who knows what is happening and needs no one to tell him how to do his job. He is the man who finds and takes unsafe short-cuts. He obviously feels he cannot make a mistake.

During this period of his work, he can be a dangerous co-worker. He is more likely to have or to cause an accident. He is the person we mean when we talk about the inexperienced worker or driver who may have our accidents. He has had just enough experience to make him overconfident. He has progressed into a phase where his actions may create hazards for himself and his neighbors.

It may take a serious accident to cause him to pass on to the third phase of his working career. There he will be more conscious of the need to do his work properly. The likelihood of his having an accident will decline.

As an employee trained in safety (and having most likely gone through the "pattern") you should recognize when your less experienced fellow employee arrives at the over-confident phase as a driver or a worker. If he is in phase two, you have a situation where you can begin corrective action. Your task will not be easy, but your resolution and effort can produce some improvement. If you will apply yourself you can solve this problem.



TOOLE ARMY DEPOT QUALIFIES FOR NSC AWARD OF HONOR

Toole AD has been recognized with a NSC Award of Honor for operating 3,651,165 man-hours without a disabling injury from 22 June 1967 to 3 October 1967.

GUIDE IMPROVES SAFETY COMMITTEE MEETING AND MINUTES

The supervisor who has received his first assignment to conduct a safety committee meeting may show symptoms of a sinking feeling. The signs should be familiar to the alert safety professional. He should remember exhibiting similar emotions when he was given an unfamiliar task without adequate instructions on how to do it.

Safety personnel in the DASO Safety Division, U. S. Army Missile Command, recognized the need to help the supervisor. They helped him be preparing and issuing the following brief "Guide - Safety Committee Meeting and Minutes":

"I.	CALL TO ORDER	Chairman
	Roll Call & Attendance (Members Present & Absent Listed)	Secretary
"II.	UNFINISHED BUSINESS PERIOD	Chairman
	Reading and Adoption of Minutes	Secretary
	Unfinished Business Reports	Responsible Member
"III.	CURRENT BUSINESS PERIOD	Chairman
	Report of Central Safety Council Minutes	*Council Represent.
	Report of Injuries & Accidents	Responsible Member
	Presentation of Monthly Safety Topic	Responsible Member
	Special Presentations (Films etc.)	Responsible Member
	Report of Monthly Internal Safety Surveys (Include Discrepancies & Corrective action)	Responsible Member
	Open Discussion - Safety Items	Members and Visitors
	Assignment of Responsibility	
	Next Month's Internal Survey	
	Next Month's Injury & Accident Report	
	Next Month's Safety Topic	
	Follow-up Unfinished Business Items	
	Designation of Next Month's Meeting	
	Designation of Next Month's Meeting (Time, Date & Place)	Chairman
"IV.	Adjournment	Chairman

* A representative of your Safety Committee may accompany organization Chief in attendance at the Central Safety Council meeting.

NOTE: Monthly Safety Committee Meeting Minutes should be signed by the Safety Committee Chairman and organization chief."

CHECKING FQR ELECTRICAL HAZARDS

Do you have an adequate checklist ready for use if you are called upon to check a new or unfamiliar piece of equipment for electrical hazards?

The 36 questions that appear below may help you prepare or revise your checklist. These questions have been extracted from Electronic Proving Ground Materiel Test Procedure 6-2-507, a Common Engineering Test Procedure for Safety, issued by the U. S. Army Test and Evaluation Command.

The personnel who conduct tests of equipment prepare safety questionnaires before they start. An electrical hazards questionnaire is only one of several that may be required. These lists are mutually developed by the test manager and the safety engineer and are included in the plan of the test to identify probable hazards that may exist. The questionnaires are written to encompass the particular hazards of the proposed operation and they include the applicable safety requirements.

The personnel who check for electrical nazards perform the following actions:

1. They carefully examine all instructional material, including schematic and wiring drawings, to determine if locations of electrical hazards are clearly indicated and appropriate caution notices and instructions are provided.

2. They conduct measurements, when in doubt, of exposed parts or points suspected of having hazardous potentials or currents.

3. They record detailed answers to the following questions based on the cumulative experience and observations of test personnel gathered over the entire period of the commodity test:

a. Is the path to ground from the equipment continuous and permanent?

b. Does the grounding system have sufficient mechanical strength to minimize the possibility of accidental ground disconnection?

c. Is the ground connection to the chassis or frame mechanically secured by one of the following methods?

1. Secured to a spot welded terminal lug?

2. To a portion of the chassis or frame that has been formed into a soldering lug?

3. By the use of a terminal on the ground wire secured by a screw or nut and a lockwasher?

d. Is the grounding system of sufficient gage size to conduct safely any currents that may be imposed upon it?

e. Is the impedence of the ground system sufficiently low to limit the potential above ground and to facilitate the operation of the over-current devices in the circuits?

f. Are ground connections to shields and other mechanical parts, except the chassis and frame, made independently of the electrical circuits?

g. Do plugs and convenience outlets for use with portable tools and equipment have provisions for automatic grounding of the frame or case of the tools and equipment when the plug is mated with the receptacle?

h. Are grounding rods provided in all transmitting equipment where voltages are in excess of 30 volts rms?

i. Are all external metal parts, control shafts, bushings and shields, exclusive of antenna and transmission line terminals at ground potential at all times?

j. Are antenna and transmission line terminals at ground potential except for radiated RF energy on their external surfaces?

k. Are all contacts, terminals and like devices having potentials in excess of 500 volts rms clearly marked: DANGER HIGH VOLTAGE?

l. Are guards, safety covers, and warning plates provided for potentials in excess of 70 volts rms on contacts, terminals and like devices?

m. Are built-in test points provided where measurements endangering life must be made?

n. Are test points and voltage dividers provided in equipment where measurement of potentials in excess of 1,000 volts is required?

o. Can high voltage circuits and capacitors be discharged to 30 volts within two seconds or less by automatic protective devices?

p. When equipment is designed to operate on more than one type of input power, are adequate precautions taken to prevent connection of improper power?

q. Are DC input power connections clearly marked for polarity?

r. Do meters have protection against high voltage or current at the terminals?

s. Are mechanical and electrical interlocks designed to prevent energizing or movement when men are in positions where it could be dangerous?

t. Are physically similar but electrically non-interchangeable components so keyed that it is impossible to insert a wrong unit?

u. Is shielding sufficiently separated from exposed conductors to prevent shorting or arcing?

v. Where design considerations require plugs and receptacles of similar configuration, are mating plugs and receptacles suitably coded and marked?

w. Are wires and cables properly protected at points where they pass through metal partitions?

x. Are wires and cables adequately supported and terminated to prevent shock and fire hazard?

y. Do floor surfaces provide adequate insulating characteristics?

z. Are emergency controls placed in readily accessible positions?

aa. Is the main power breaker in an easily accessible location?

bb. Does the main power breaker cut off all power to the complete equipment or system?

cc. Are safety switches provided which will deactivate associated mechanical drive units without disconnecting other parts of the equipment?

dd. Are remotely located assemblies provided with safety switches to allow independent disconnection of the equipment?

ee. Are rotating antennas provided with a local power cutoff switch at the antenna?

ff. Are potential electrical hazards adequately treated in the instruction manual?

gg. Are controls located away from high voltage points and hot tubes?

hh. Are internal controls such as switches located away from dangerous voltages?

ii. Is the equipment designed so that receptacles are "hot" and the plugs are "cold" when disconnected?

jj. Does the design of connectors prevent electrical contact from being shorted by external objects?

* * * *

PORTABLE DESK LAMP HAZARD

Sidney Levin
Chief, Industrial Health and Safety Branch
U. S. Army Materials and Mechanics Research Center

An AMC employee recently came in contact with a portable desk lamp whose interior connections were shorted to the metal portion of the lamp. The employee was unable to release his hold on the lamp but the force of his fall served to break his hold. The electrical shock rendered him unconscious for a short period. He was revived and suffered no apparent ill effects.

The lamp in question was a swing arm fluorescent type. The cause of the short was a broken ceramic connector used to join and insulate the junctions of the lead wires within the base. This allowed the wires to contact the metal housing.

The Army Materials and Mechanics Research Center in Watertown, Massachusetts, has been aware of the potential hazard of all metal desk lamps and has installed an equipment ground wire to prevent this type of accident from recurring.

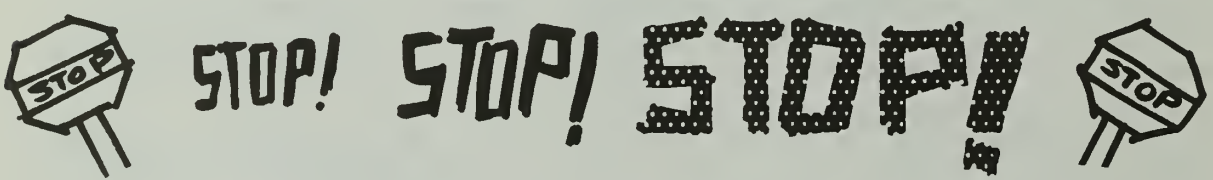
HABIT PLUS BLOCKED AISLE EQUAL ACCIDENT

During the last half of the first shift a wooden pallet was moved from the rear of a power shear into an aisle. The shear operator placed sheared pieces on the pallet and told the forklift operator the pallet could be moved. Prompt action to move it was not taken.

Six hours later, during the next shift, a crane operator had occasion to go down the aisle to reach his parked car. He had walked along this aisle every workday for the year he had been on the night shift. Though no night lights were on now, he proceeded, secure in his familiarity with the path he was following.

Walking in the dark, he struck the pallet, fell over it and sprained his right ankle. The ankle sprain and a back contusion caused him to be away from work for a week.

All supervisors were instructed to make certain that all aisles and walkways were kept clear of stored material. The lead man on the shift was made responsible for seeing to it that night lights will be turned on in the building where the accident occurred.



A contractor truck-tractor operator was driving his tractor down a plant street, pulling an empty trailer. The day was sunny, the road was dry and the driver was wide awake. When he

saw in the roadway a heavy paper liner for a cartridge storage case, he promptly decided he should pick it up. He braked his tractor to a stop.

An assistant foreman was driving a carryall down the same street. As the tractor-trailer slowed and halted ahead of him, he brought his vehicle to a full stop 30 feet behind the rig. He then discovered the trailer was moving back toward him. He sounded his horn, but the trailer came on. It made contact with his vehicle and began to push it backward down the street.

A passenger in the carryall leaped out and ran forward to secure the attention of the tractor operator. When the driver saw the signals, he stopped immediately.

The tractor operator explained that he was backing before dismounting to retrieve the liner in the road. He had not seen the vehicle close behind the trailer. The carryall driver explained that the tractor-trailer came back so unexpectedly and so fast that he was unable to move his vehicle in time to avoid the accident.

Damage to the smaller vehicle was estimated at $323.

The tractor driver was given a written reprimand and his plant driver's permit was suspended for failure to follow the plant driving procedure. This procedure required a tractor-trailer driver to assure proper clearance before backing and to have a spotter to assist him by making certain all was clear behind.

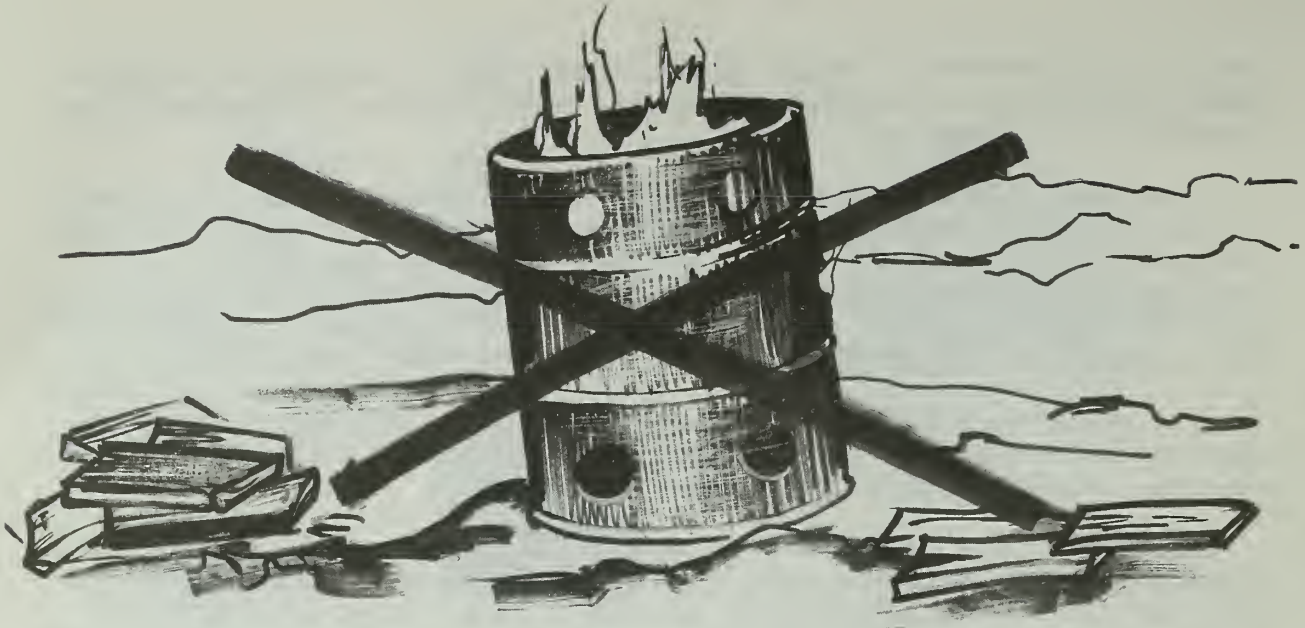
The carryall driver was given an oral warning to drive in a defensive manner to be alert to the movement of other vehicles.

OVERDRESSING HAS ITS HAZARDS

It was cold and raw outside and the contractor employee dressed for warmth. In addition to a normal amount of underwear he wore three pairs of trousers and a hooded sweatshirt. Over these he pulled a pair of soiled coveralls. These had been worn for two days and had absorbed a quantity of oil and grease.

Because of the cold weather a fire was started in a 55-gallon metal drum. Short lengths of wood were burned and workers were allowed to warm themselves from time to time.

When the heavily dressed worker returned from lunch, he decided to warm himself. He later reported he stood with his back to the barrel and two to three feet away for three or four minutes. Feeling warm enough he then went back to work.



Because of the amount of clothing he was wearing, he was not aware of just how hot his oil-stained outer coveralls had become. These apparently came into contact with the hot metal, the flame or a spark from the burning wood. By the time he moved off to work the back of his coveralls was smoldering.

The fresh breeze soon fanned the smoldering spot into an open flame. For a short period the man remained unaware of this because of the clothing layers underneath. The fire soon began to burn through and the man discovered his back was blazing.

Frantically he began to undress. The needed speed was hampered by the many layers of clothing. A foreman and a fellow worker came outside the building, saw the flame and rushed to assist the man. The burning garments were removed but not before his lower back and buttocks were severely burned.

It was estimated that his second and third degree burns would cause the employee to be away from work for four weeks.

The following actions were taken to prevent similar incidents:

1. It was made clear to supervisors and workers that open fires of any type were not authorized to warm personnel on the plant premises. The barrels were removed from the area where the worker caught fire. Vigorous follow-up inspections were made to make certain drums were not used again for warming fires.

2. It was recommended that contractor-issued clothing be treated to make it flame resistant.

LOOK OUT AHEAD !

Two Army employees were removing batteries from a pallet on a forklift and loading them into a conex shipping container. The conex was almost full. One packer moved outside while the other moved the last items into place. When the man outside saw the last battery go into place, he signaled the operator to move the forklift to the next conex.

The operator started the forklift and began to back away. The machine had to move up a grade. The left rear wheel hit a one-inch thick board and the obstacle was enough to cause the forklift to come to a stop.

The driver applied his brake and studied the situation. Still looking to the rear, he released his foot brake and applied gas in another effort to back over the obstacle. Before the machine started back again it rolled forward about two feet down the grade toward the conex.

Unaware of the difficulty experienced by the forklift operator, the worker inside the conex stepped backward outside at this moment. As he turned to walk to his left, he was caught by the moving forklift. His left leg was pinned between the floor of the conex and the lifted pallet.

The operator backed the machine away and the worker was released. He was rushed to the dispensary and his leg was found to have sustained multiple fractures.

Actions taken to prevent similar accidents included the following:

1. Orders were issued that no forklift would remain in front of a conex with a load on its forks. The driver would approach the conex with extreme caution and drop his load at the entrance. When the pallet was empty, the driver would approach and remove it.

2. Personnel were cautioned to look in the direction they were walking or driving.

3. Material handling operators were instructed to operate with extreme caution in congested areas.

INATTENTION YEILDS KING-SIZED HEADACHE

A service truck brought freshly charged batteries to the sites where electric forklifts were operated at an Army installation. It was almost 0900 hours when the truck arrived at an igloo where one machine was being used.

The operator stopped his machine and helped the service truck personnel make the change. The battery was disconnected and a lifting bar was attached. It was lifted from the forklift by a truck-mounted crane and swung into place on the bed of the truck. The operator moved onto the bed and disconnected the lifting bar.

Before attaching the lifting bar to the fresh battery, he started to transfer the insulating mat from the cold battery to the fresh replacement. As he bent over to remove the mat, he found the lifting bar and its supporting cable in his way. He put up his hand and absent-mindedly brushed it aside.

His inattentive shove moved the bar and cable out about two feet. It then swung back. A heavy cable ball above the bar struck the worker on his forehead. (See posed photo.) The blow disabled the man for an estimated 23 days.

The installation established the following procedure to make the battery changing operations safe:

1. The forklift operator would spot his forklift, remove the necessary pins and unplug the battery. He would then move at least 20 feet away from the machine. Any other workers in the vicinity would stand back at least 20 feet.

2. The battery truck crew would then change the battery.

3. All personnel working with or close to cranes would wear hard hats.

NOISY TOYS MAY IMPAIR HEARING

Paul A. Fair, Chief, Acoustical Research Branch
U.S. Army Human Engineering Laboratories, Aberdeen Proving Ground

Impulse noise measurements have been made using several types of "popguns" which are sold commercially as children's toys. The results of these measurements have shown peak overpressures to be in excess of hearing hazard criteria standards established for U. S. Army weapons. None of these "popguns" discharge any type of projectile; the primary objective of design appears to stress the simulation of the firing of a regulation rifle.

One of these devices tested showed a peak overpressure of 1 psi (171 dB) taken at eight inches perpendicular to the muzzle. This peak pressure level is higher than at the firer's ear position when firing the M14 Army rifle.

Acoustical hazard limits have been established for adult military personnel exposed to gunfire noise and assumes that certain amounts of temporary threshold shift (TTS) are permissible for persons with normal hearing. It was assumed that these amounts of TTS would not be detrimental to the performance of personnel nor would they pose much risk of permanent hearing loss. In the opinion of some researchers in the impulse-noise effects field, children should be protected from any amount of TTS, if possible. Since only adult subjects have been tested to generate these data, it is suggested that "safe" exposure for children should be lower than maximum noise limits established for adults.

The evaluation of various noise studies and conclusions of acoustical working groups recommended that peak pressure level should not exceed 140 dB re 0.0002 ubar, as does at least one official Army medical document (TB MED 251).

The peak level measurements indicate, according to the 140 dB "safe" limit that these devices constitute a definite potential noise hazard to children. A "Letter to the Editor", was published in the Journal of the Acoustical Society of America, Vol. 40, No. 4, Oct. 1966, entitled, "Acoustical Hazards of Children's Toys", by Dr. David C. Hodge and R. Bruce McCommons. This problem of hazardously noisy "toys" was also discussed in the June 1966 issue of Consumer Reports, p. 266.

THIRTEEN WAYS TO AVOID SUDDEN DEATH

To many persons the traffic safety problem seems hopelessly complex. As a result they disregard as unimportant the little things that make for safe driving. Here are 13 simple rules that, if followed, would greatly reduce our annual traffic toll.

1. Obey Speed Limits - These are for your protection. They represent maximum rates that are safe and legal under favorable conditions. When traffic is heavy or weather is bad you should slow to a "reasonable and proper" speed.

2. Signal Plainly - Signal well in advance for every turn, stop or change of lane. You will be safer, and you are being courteous to other drivers, who can pass you safely without waiting.

3. Obey Stop Signs and Signals - Come to a complete stop for red lights and stop signs. Look both ways for cross traffic. Thousands are dead or crippled because they thought no one was coming.

4. Get In the Proper Lane - If you are turning, you should get in the proper lane before reaching the intersection. Here again you are being both safe and courteous.

5. Do Not Drink and Drive - Tests have shown it takes very little alcohol to stimulate your self-confidence, reduce your alertness and coordination, and slow your reflexes.

6. Stay in Line - Do not pass on hills or curves. The driver coming just out of sight may be traveling faster than he should. What appears to be a safe passing distance may not be.

7. Watch for Pedestrians - They should cross only at intersections, with the green light, if there is one. But some are careless and inconsiderate, and they may step into the street from behind parked cars.

8. Do Not Compete With the Traffic Hog - To dispute the right of way might cost your life or the life of a loved one.

9. Reduce Speed at Night - Your range of visibility is reduced at night, but not your stopping distance. The night traffic death rate is sharply higher than the day rate.

10. Keep Your Car in Top Condition - Brakes good enough for normal driving may let you crash if you get into a tight spot. Lights properly focused help you see the pedestrian in dark clothing, or the unlighted vehicle ahead.

11. Keep Your Distance - Stay behind the vehicle ahead at least one car length for each ten miles per hour of speed. In bad weather stay farther back.

12. Watch for Children - They are unpredictable. If one darts into your path, a little less speed or a little more caution may mean all the difference.

13. Watch for Traffic Signs - Be alert to see and follow signs and markers. Truly they are signs of life.

- POWDER PRESS
Radford Army Ammunition Plant

* * * *

A LESSON LEARNED

J. L. Larsen, Safety Director
Letterkenny Army Depot

A dock plate was positioned between a boxcar and raised dock for loading material at a storage warehouse. A forklift truck was operating in and out of the boxcar. Each time it rolled onto the dock plate one end would raise about six inches and fall back to the dock level. On one occasion an employee was preparing to enter the boxcar just as the end of the dock plate raised. It then dropped directly on the employee's toe cap.

The dock plate cut a three-inch gash in the shoe leather and dented the steel cap. No injury occurred to this employee, but he might have suffered badly lacerated and broken toes had he not been wearing safety shoes. He was awarded a lifetime membership in the Golden Shoe Club.

The incident also called attention to the need for dock plates that were properly sized to eliminate movement when forklift trucks passed over them.

SENSITIVITY OF METAL-HALOGENATED SOLVENT COMBINATIONS

by G. D. Artz and C. R. Fingerhood
Research Div., ROCKETDYNE
Div. of North Am. Rockwell Corp.

Impact sensitivity tests were found to be beneficial in determining the sensitivity of barium/Freon TF combinations. Because of the widespread use of halocarbons and potentially reactive metals within the industry, it was deemed prudent to extend the impact sensitivity experiments to include a series of metals and halocarbons currently in use.

Literature surveys disclosed that very little has been written in the general chemical field on barium and its reactivity. Only when the literature surveys include the pyrotechnics and explosives areas do we begin to find indications of the explosive reactivity of barium and halocarbons. This same literature survey also disclosed that granular metals other than barium have on occasion reacted unexpectedly and explosively with halogenated solvents, including aluminum powder with carbon tetrachloride and aluminum powder with trichloroethylene. This type of behavior of powdered or granular metals after exposure to supposedly "safe" solvents raises considerable doubt about their safeness. The program described herein was conducted to determine just how sensitive to impact various metal/halocarbon slurries are, and to determine, if possible, if a potential hazard (due to impact) exists in the handling of more common powdered or granular metals in contact with a variety of commonly used halogenated solvents. The combinations chosen for this program are representative of the kinds that are in general use; they include some combinations known to be or likely to be used in manufacturing or laboratory operations. Ten different kinds of metallic powders or granules were tested with six different solvents, giving a total of sixty combinations. A brief description of these particular metallic materials and solvents is as follows:

METALS:

Aluminum Powder	-	Reynolds No. 1-511 Atomized Powder, 13 ± 3 microns, Reynolds Metals Company
Mg Powder	-	30/50 Mesh Atomized, Harshaw Chemical Corp.
TI Powder	-	Laboratory sample labeled "+325 mesh", origin unknown.
Ba Shavings	-	Shavings produced by cutting up nominal 1 mm X3 mm granules, Alfa Inorganics, Inc.
Li Shavings	-	Small shavings cut from an ingot, Lithium Corp. of America.
Be Powder	-	Fine Powder (size unknown) Brush Beryllium Corp.
BeH_2 Powder	-	Fine Powder (size unknown) Ethyl Corp
Aluminum Filings	-	Filings produced with a coarse rasp from a sheet of commercial aluminum (grade unknown).
Magnesium Filings	-	Filings produced with a coarse rasp from a sheet of commercial magnesium (grade unknown).
Boron Powder	-	95 +% Purity, average particle size less than 1 micron, American Potash and Chemical Corp.

SOLVENTS:

Freon MF CCl_3F	-	Monofluorotrichloro methane, E. I. duPont
*Freon TF $C_2Cl_3F_3$	-	Trichlorotrifluoro ethane, E. I. duPont
Carbon Tetrachloride CCl_4	-	Mallinkrodt Chemical Works, Analytical Reagent (low Sulfur)
Trichloroethylene C_2HCl_3	-	Mallinkrodt Chemical Works, Analytical Reagent
Perchloroethylene C_2Cl_4	-	Tetrachloroethylene, Matheson Coleman and Bell, Spectroquality Reagent
1,1,1 Trichloroethane CH_3CCl_3	-	Methyl Chloroform, Matheson Coleman and Bell, Technical Grade

The impact sensitivity test apparatus used on this program is a slight modification of the Jet Propulsion Laboratory (JPL) impact sensitivity tester. Basically, the test is conducted by putting a small sample (a few milligrams) of the material to be tested inside a shallow depression in a hardened steel anvil,

then dropping a steel ball of a known weight from a measured height so that it strikes a hammer which is in contact with the sample. A "go" on this tester is evidenced by either a flash or a loud noise or both. By increasing the drop height after each "no go" or lowering the height after a "go" it is possible to get some idea of the impact sensitivity of the material being tested. The sample is changed after each "no go" so that a fresh sample is used for every test.

Most of the many kinds of testers in current use appear to give a different impact sensitivity value for the same material. For this reason it is generally necessary to reference the results obtained for a new material against some well-characterized material tested on the same impact machine. This type of comparison is more meaningful than an absolute value stated in some units of weight x height would be, even though these absolute values are often quoted (for a given type of tester) as an indication of the impact sensitivity of a material. The reference material used in this program was Composition B, a high explosive consisting of a blend of RDX and TNT with a small amount of wax added.

Most of the metal-solvent combinations tested were run in an identical manner. A quantity (not weighed) of the powdered or granular sample sufficient to fill the cavity in the anvil was used in each test. When the solvent was added in excess and allowed to remain in contact with the powder for about a minute prior to dropping the ball. Where solvent had a tendency to evaporate, especially evident with Freon MF, additional solvent was added at intervals so that an excess was present at all times up to the time of impact.

With test involving barium it was believed desirable because of the reactivity of barium with oxygen and moisture to minimize or eliminate exposure to air prior to the impact of the ball*. Accordingly, whenever barium was handled it was always done in an argon atmosphere up until the sample could be "drowned" in the solvent. Lithium, also reactive, was cut into shavings under an argon atmosphere but less care was taken to exclude air in subsequent operations. An attempt was made to minimize exposure to air of the aluminum filings and the magnesium filings by producing only enough filings at one time for a few tests, then testing them very quickly afterward. In all the other tests no attempt was made to exclude air from the metals at any time.

The maximum drop height capability of the test apparatus employed is 50 inches. With a 5-pound ball, any material that fails to show any reaction at 50 inches is usually considered to be relatively insensitive to initiation by impact. (Composition B, previously mentioned as our reference material, showed a 50% probability of detonating at 8 inches on our tester.)

* There is some evidence that moderate exposure of barium to air does not materially affect its sensitivity. Prior to running this present series of 60 combinations, it had been found in an earlier test that the barium-Freon TF combination in which no attempt was made to exclude air after the barium had been cut into shavings gave flashing at a 3-inch height with a 5-pound ball. This compares very closely with the value of 4 inches with the same 5-pound ball, found during the current tests where air exposure was eliminated. The difference between the 3-inch height and 4-inch height is considered to be of little significance, probably well within the experimental range of values to be expected from this type of test.

* * *

Ordinarily the impact sensitivity heights reported in the literature are 50% probability levels, although in some instances the height given is the 10% probability point. Both levels are arrived at by some up or down system (normally Bruceton series) of varying the height from test to test and require that fairly large numbers of tests be run. In the current program the objective was more concerned with determining the approximate minimum height at which a reaction occurred, rather than determining the statistical probability of this event occurring. Because of the limited number of tests run on each combination, it is reasonably certain that the minimum heights given for many of the combinations in Table I are higher than would have been obtained had a larger number of samples been tested.

The maximum height of 50 inches was utilized for the initial testing of most combinations. If three consecutive "no go's" resulted, it was presumed that this particular combination was insensitive to impact and no further tests were run on this combination. If any of these initial three tests produced a detonation or flash, the height was progressively reduced until a height was reached where three consecutive tests failed to give a go, at which point testing of that combination was stopped. Therefore the values given in Table I are these heights at which a reaction occurred at least once out of three attempts.

Looking at Table I, a number of things are evident. Probably the most evident is that combinations with barium are definitely the most sensitive of all combinations tried. This sensitivity, greater even than lithium combinations, is at first glance very surprising, since lithium is a member of the extremely reactive alkali metal series, and is higher in the electromotive series than barium. However, the German references also showed the barium slurries to be both more sensitive to initiation and more violent in their reaction

than lithium slurries with the same halocarbon. The value of 4 inches at which a flash occurred (as mentioned previously, an earlier series of tests had given a value of 3 inches) indicates that the barium-Freon TF combination is a very hazardous one. In fact, Freon TF combinations were among the most reactive with all the metals tested.

The term "detonation" as used here indicates that a loud noise, usually accompanied by a bright flash and smoke, were produced. There was also a strong pungent odor produced, and the test apparatus and immediate vicinity were covered with a film of gray or black material. None of the original sample was found in the apparatus.

Where only flash or heavy sparking was recorded, the only noise that could be detected was the background noise produced by the impact of the ball striking the test apparatus. In these instances part of the original test sample was found to be still in the apparatus, just as it was when there was no evidence of a reaction.

Table I shows that one of the metals gave a positive reaction with 1,1,1 trichlorethane (methyl chloroform). This might indicate that this would be a safe solvent to use. Unfortunately, this conclusion is not necessarily a valid one. Although the tests show that 1,1,1 trichloroethane is safer, its composition is very similar to some of the other solvents, so that under the proper conditions it might react much as these other solvents do.

Based on the results of this program and on the limited, brief literature search, there is a definite potential hazard in handling granulated metal-halogenated solvent combinations. Serious consideration should be given to the use of nonhalogenated solvents whenever possible, even if it means increasing the flamability hazards of the operation. Adequate measures (ventilation, inert atmospheres, grounding, etc.) can usually be taken to reduce this flammability hazard.

The use of an ever-increasing variety of new metals and alloys in industry may produce some very sensitive combinations if these materials are exposed to halogenated solvents. Before any halogenated solvents are used with powders, shavings, chips, etc, of these new metals or alloys the reactivity should be determined by some sort of impact sensitivity tests as a minimum requirement. It might be wise to run other sensitivity tests as well, since a combination which appears to be insensitive to impact may be sensitive to another mode of initiation.

These precautionary measures with halocarbons are probably not necessary when handling large pieces of sheet metal, billets,

castings, or machined parts, if proper care is taken to previously ensure the removal of chips, cuttings, filings, and grindings from the parent material.

Armed Services Explosives Safety Bd.
PI Report No. 39

TABLE I

MINIMUM IMPACT SENSITIVITY HEIGHT (inches)

(5-lb Ball)

SOLVENT	METAL									
	Al Powder	Mg Powder	Ti Powder	Ba Shavings	Li Shavings	Be Powder	BeH_2 Powder	Al Filings	Mg Filings	B Powder
Freon MF	F,50	0	0	X,20 F,15	X,50 F,40	0	0	0	0	0
Freon TF	F,50	0	F,50	X,10 F,4	X,20	0	0	0	0	0
Carbon Tetrochloride	X,50	F,50	0	X,15 F,10	X,18	F,50	0	0	0	0
Trichloroethylene	0	F,50	F,50	X,15 F,13	X,25	F,50	0	0	0	0
Perchloroethylene	0	0	0	X,20 F,15	X,30	0	0	0	0	0
1,1,1 Trichloroethane	0	0	0	0	0	0	0	0	0	0

X,Number - Height in inches at which detonation occurred.

0 - No reaction at 50 inches.

F,Number - Height in inches at which flash or heavy sparking occurred

CONTROLLING STATIC ELECTRICITY DURING EXPLOSIVES OPERATIONS

G. C. Deane
Safety Division, Picatinny Arsenal

Throughout industry, and particularly in the field of explosives, the general method for eliminating or reducing the hazard from static eleccticity is to provide an electrically continuous path to the ground.

The generation of static electricity is not the hazard. The hazard is created when charges are allowed to accumulate to the extent that a discharge occurs with sufficient sparking capacity to ignite flammable vapors, gases, explosives and combustible dusts.

Picatinny Arsenal personnel authorized to perform this work use extreme care when checking on "bonding" and "grounding" of equipment, as there are separate and distinct functions for these two terms. "Bonding" is done to eliminate a difference in static potential between objects. The purpose of grounding is to eliminate a difference in static potential between an object and ground. Bonding and grounding are effectively applied only to conductive parts.

Grounding exterior parts of containers alone does not necessarily eliminate all of the danger from static electricity, for in order to be completely effective, grounding must include the contents. Nonconductive equipment such as glass, plastic or lined vessels require special methods to convey electrical charges to ground in order to minimize their build-up during transfer of low conductivity liquids. In addition to bonding and grounding when pouring liquids from one container to another, a metal rod should be placed in the liquid to prevent static build-up that may develop from flowing liquids. The metal rod must be grounded. A further precaution is to have the fill pipe of such length as to terminate near the bottom of the container being filled to reduce the distance of "free flowing" liquids. (See Diagram.)

Static ground wires should not be attached to electrical conduit piping, gas, steam or air lines, dry pipe sprinkler systems or the air terminals of lightning protection systems affixed to roofs of buildings. Static ground wires may be attached to water pipes, buried copper plates, or to ground plates, or to ground rods driven into the ground. In locations where a static spark discharge may be dangerous, all conductive parts of equipment should be grounded to a maximum of 25 ohms.

Static electricity controls should include the following:

a. All personnel working in static sensitive areas must wear authorized conductive safety shoes, cotton socks or stockings, and cotton under and outer garments.

b. Conductive footwear must be tested each day for adequacy of electrical conductivity. Conductive footwear shall be kept in good repair.

c. Wherever compatibility with materials involved permits, at least 60 per cent relative humidity at 70° temperature should be maintained.

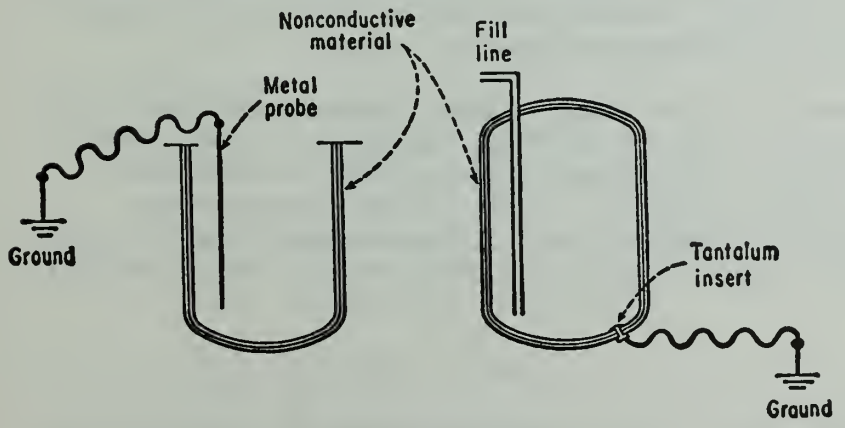
d. All equipment, furniture and accessories should be constructed of metal or other electrically conductive material. These should make good electrical contact with the floor and be individually grounded.

e. The floor must be kept free of wax, grease, chalk and other material that would increase its surface resistance.

f. In special cases, where items involved are sensitive to very low levels of electrical energy, wristlets must be worn by all operating employees and the wristlet must be grounded. Individual hand tools must also be grounded.

With the coming of the fall and winter months, when the humidity is low, the hazard of static electricity will increase. Be sure to check out all grounds for continuity and adequacy.

(Editor's Note: The material in this article was extracted from information disseminated to Picatinny Arsenal employees by the Arsenal's Safety Division.)



NONCONDUCTIVE equipment such as glass, plastic or lined vessels require special methods to convey electrical charges to ground in order to minimize their buildup in process liquids.

A MODERNIZED AMMUNITION MAINTENANCE FACILITY

P. A. Rodio
Acting Chief, Weapons and Munitions Division
Directorate of Maintenance, Army Materiel Command

At the start of World War II we had the typical ammunition workshop areas at our old depots such as Delaware, Savanna, Charleston, Nansemond and Raritan. Generally, these workshops included a scattering of asbestos corrugated framed buildings separated by intraline distances. All operational traffic was by manual means, including hand drawn carts to transport ammunition between buildings. Operating methods were rather primitive, and hazardous exposure of personnel was beyond imagination by today's standards.

This is not intended to cast adverse criticism on our predecessors. Their performance and accomplishments were something short of miraculous under the circumstances. This was the nucleus from which the World War II ammunition capacility was formed.

The next significant step was the introduction of the normal maintenance, care and preservation building, and other lesser facilities.

The aging World War II stockpile of ammunition introduced demands far greater than the depot facilities could accomodate. These demands peaked during the Korean incident. Despite the wide deficiency of facilities the job had to be done. And, it was done but only by improvision, conversion and adaption of whatever we had to support the task. Packing and crating sheds, less than carload buildings and even field mess halls were converted to operating buildings. At one major depot, an operating building was built from scrap lumber and metal liners salvaged from small arms ammunition packing boxes.

While this all served a purpose, these improvisations soon became a curse. We had to live with that which we created and we found ourselves victims of our own ingenuity. These substandard structures became targets for visiting inspectors. Vivid descriptions such as "shack town", "town dump", and other well-chosen descriptive phrases were documented in their reports.

STATUS OF FACILITIES

While some of our depots have near adequate facilities, a

good part of the ammunition task is still being accomplished in sub-standard facilities, affording at the very best only marginal safety and operational efficiency.

Past budgetary limitations resulted in a situation whereby the justification for single-purpose buildings was nearly impossible.

New and novel weapons could not be accommodated in existing facilities because of complexity and size.

These factors led to the development of the multi-purpose ammunition facility.

The development of this facility was accomplished by one of the nation's leading consultant engineering firms under contract by Office of the Chief of Engineers, U. S. Army. This firm had amassed a wealth of proven engineering advances while engaged in research and development of protective shelters for the Army. These latest design parameters have been incorporated in this facility, particularly the barricades.

The building also includes the thinking of our National Maintenance Points and grass-roots input from operations people at depot level.

Three of the facilities are under construction and three more are planned for the future.

MAINTENANCE FACILITY

Drawing Number 16-06-324 shows this facility involves a complex of buildings. These include:

1. Main Ammunition Maintenance Building.
2. Flammable Storage Building.
3. Vacuum Collection Building.
4. Four Service Magazines.
5. Missile and Rocket Hold Down Stand.
6. Lunch Room and Change House.
7. Perimeter Fencing.
8. Service Roads.
9. Parking Areas.

10. On the right of the drawing there is a quantity-distance diagram.

11. Detailed quantity-distance requirements are posted on the chart at the top of the drawing.

OPERATIONAL CONCEPT

The Ammunition Maintenance Facility is designed for maximum utilization and versatility. The main ammunition building of this facility provides for two operating lines in the same building. The two operating lines are separated by a 24-inch thick roof-high, reinforced concrete main center wall.

To achieve this operational flexibility the ammunition building is designed for the performance of concurrent maintenance operations on items possessing similar as well as dissimilar hazards. This encompasses all levels of maintenance, including unpacking, defuzing, disassembly, change of propelling charges, depriming and repriming, refuzing, abrasive cleaning, painting, stenciling, and other related operations for a complete maintenance task.

The building is designed to minimize propagation of up to 5,000 net pounds of high explosives between operating bays. This safety factor presupposes normal safety practices such as properly spaced conveyor-fed items to prevent transmission of an accidental explosion, standoff distance (36 inches) of explosive items from walls and other normal safety practices required by AMCR 385-224. (Standoff distance excludes ammunition items on conveyors.)

For siting purposes, 25,000 net pounds of Class 7 explosives have been assigned as a total building limit. Specifically, when the quantity of Class 7 explosives exceeds 5,000 net pounds of high explosives in any bay, on or in the immediate vicinity of the dock (i.e., explosives on the dock and explosives in a vehicle) all explosives in the building will be added together and the total quantity involved shall not exceed 25,000 net pounds. This 25,000 pound limit does not apply in the building when the quantity of explosives in any barricaded location does not exceed 5,000 net pounds of high explosives.

The ammunition maintenance facility has been safety approved for concurrent operations of both lines with the following limitations:

1. Melting, screening or loading of high explosives in the ammunition maintenance building are prohibited.

2. Electrical continuity testing of large missiles

and rocket motors will not be conducted in the main operating building. Small missiles and rockets (without live warheads) containing not more than 15 pounds of Class 7 propellants and/or 50 pounds of Class 2 propellants may be continuity tested. Only one missile or rocket will be tested at one time.

3. Neither bulk black powder nor bulk initiating explosives will be processed.

4. Ammunition containing either toxic agents or blistering gases will not be processed.

5. Special weapons will not be processed.

6. Concurrent operations are prohibited when Class 7 explosives materiel in any bay, dock or combination of locations, subject to en masse detonation, exceeds 5,000 pounds of high explosives.

These restrictions pertain to the concurrent operational concept. When it becomes necessary to perform these restricted operations, planning should consider single line operations on a different shift basis or locating these hazardous operations in another facility meeting appropriate safety standards.

Normally, maintenance tasks are of a relatively short duration. Individual tasks may range from a few items that can be maintained in one day or less, to thousands of items requiring several months to complete the total quantity. While most operations can be scheduled, flexibility is needed for sudden response to maintenance requirements of higher priorities.

Production rates will vary with the specific item and the scope of maintenance to be performed. Actual production rates are difficult to establish due to this variation. The following are desirable objectives:

1. Typical artillery, ammunition small rockets, etc.---
800-1,000 rounds/8 hours.

2. Small guided missiles---------100-300 rounds/8 hours.

3. Large rocket motors----------3-5 rounds/8 hours.

From a safety, operational and economical view, the Ammunition Maintenance Facility offers the following advantages:

1. It offers a substantial increase in safety over present facilities. This is particularly true from the protection afforded by stronger dividing walls, separation of operations, production flow, and modern services specifically engineered to hazardous environments.

2. The design versatility affords maximum utilization needed to perform the ammunition mission.

3. Apart from the primary advantages of safety and operational efficiency, additional economies and benefits include:

a. Maximum use of ancillary services which would have to be duplicated in a multi-building concept.

b. Maximum utilization of operating and supervisory skills.

ACCIDENT -FREE DRIVING AWARD PRESENTED BY CO, USAMER&DC

Frizelle Givens, center, who has had 17 years of accident-free driving of government vehicles, and Perry W. Gilliam, who has a seven-year accident free record, are shown with COL Edwin T. O'Donnell, Commanding Officer of the U. S. Army Mobility Equipment Research and Development Center, Fort Belvoir, who presented them with pins and cards from the National Safety Council. Pins and cards also were awarded to Richard A. Jackson (14 years), Henry L. Hayes (seven years) and Calvin T. Bushrod (one year), who were on official travel status when the ceremony was held.

PLEXIGLAS - HANDLE WITH CARE

U. S. Army Board for Aviation Accident Research
Fort Rucker, Alabama

While failure to clean aircraft windshields, windows and plastic bubbles restricts pilots' visibility, improper cleaning or care of these surfaces results in costly damage. At one military installation, the use of dry paper towels damaged several canopies before the practice was discovered and stopped. Excluding labor, the cost of replacing each damaged canopy was more than $5,000.

Instead of using a chamois or a soft cloth to clean morning dew from a windshield, one mechanic climbed into the cockpit and operated the wipers. Accumulated dirt on the windshield rubbed across it, producing scratches which ruined the windshield. Replacement cost more than $2,300.

Correct procedures for cleaning plexiglas include:

1. Flushing exterior surfaces with water, using bare hand to feel and dislodge dirt, sand or mud.

2. Washing with mild soap, Federal Specification P-S-620, and water, using a soft cloth, sponge or chamois.

3. Drying with a clean, damp chamois, soft cloth or tissue. If possible, this should be done in the shade, as sunlight will cause spotting and decreased visibility. If a cleaning or polishing compound is to be used, it should conform to Military Specification MIL-C-18767.

4. Cleaning interior surfaces by dusting plastic lightly with a soft, clean cloth saturated with clear water, then wiping with a soft, damp cloth or sponge.

DON'T!

1. Use hard, dirty or gritty cloths for cleaning.

2. Use coarse cloths, such as cheese cloth, for polishing.

3. Wear rings, ID bracelets or other items which may damage surfaces.

4. Rub plastic with a dry cloth or paper towel. This causes scratches and builds up an electrostatic charge which attracts dust particles to the surface. If the surface should become charged, blotting gently with a clean damp chamois will remove the charge as well as dust.

5. Allow gasoline, kerosene, cleaning solvents, etc., to come in contact with plexiglas.

For additional information, consult TM 55-405-3, Army Aviation Maintenance Engineering Manual, Maintenance of Aircraft Systems.

- Monthly Maintenance Summary

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CG, TECOM PRESENTS AWARD OF HONOR FOR SAFETY TO PRESIDENT USA ARTILLERY BOARD

Colonel Paul S. Cullen, right, president of the U.S. Army Artillery Board, Ft. Sill, Okla., receives the Army Materiel Command Award of Honor for Safety presented in recognition of the board's outstanding achievement in accident prevention during FY 1967 and its accomplishments in maintaining the highest rated safety program within the U.S. Army Test and Evaluation Command for the same period. The plaque was presented by Major General Leland G. Cagwin, USATECOM commander, during the recent commanders conference at Ft. Benning, Ga.

CRANE BOOM LOADING

Hazardous loading of crane booms, which could lead to either overturning the crane or to buckling the boom, can be avoided if you understand crane ratings. Every construction crane should be provided with a chart showing its rated capacity. The rated capacity can be safely handled if you pay attention to the following points:

1. The safe load depends upon the boom length and the radius. Make sure that you know what length of boom you are using. Remember that radius is measured from the center of rotation, not from the boom foot pin.

2. The published load does not include the weight of the hook or materials handling devices. Subtract the weight of equalizer jibs, concrete buckets, or jib extension from the rated loads to determine the weight of material that can be handled.

3. Ratings are based on operating on firm ground, and in the case of mobile cranes, with the outriggers fully extended. Make sure that the crane is not operating on ground that is too soft or with outriggers that are not properly blocked and extended.

4. Ratings are based on operating on level ground. Operating on grades increases boom stresses. If you pick up a load on the high side of a slope and swing to the low side, the radius will increase and can cause the crane to tip. If operating at high boom angles, a swing from the low side to the high side can cause the boom to collapse over the cab.

5. Avoid fast operations. Fast swings cause the load to swing out, thus increasing the radius. Rapid hoisting or braking of the load increases the boom stresses and can overload the rigging.

6. Do not handle heavy loads with a large surface area when there are high winds. Wind gusts can create an instability condition.

7. Make sure the crane is properly rigged, that it has the correct counterweight, the proper boom, the right boom mounting position, the gantry properly rigged, and has adequate parts of line.

8. Avoid traveling with a heavy load. The boom is subjected to shock and bending stresses if moving over uneven

ground and swinging of the load creates inertia forces which can cause collapse of the boom.

9. Do not use a crane with a bent or damaged boom. Booms must be straight and in good repair.

10. If in doubt as to the ability of a machine to lift a load make sure that you attempt the lift in the most stable position. For example, with a truck crane, pick the load up over the rear where stability is greatest and then boom up before swinging over the side.

There are many safety devices available (such as overload indicators, boom back stops and level indicators) but in terms of reducing hazards, there is still a requirement for all crane users to understand load rating and to exercise intelligence, care and common sense.

- D. D. Krass
Hydro-Electric Power Commission
Construction Safety Release No. 62
National Safety Council

* * * *

MG LOLLIS CG, TACOM PRESENTS AMC AWARD OF MERIT TO CO, LIMA MODIFICATION CENTER

Shown in photo above is MG Lollis, Mr. Shirock, Safety Director, TACOM, Major Larson, CO, and Mr. Burger, Safety Officer, Lima Army Modification Center.

MG EIFLER, CG, MICOM PRESENTS AMC AWARD OF HONOR TO ROHM AND HAAS REDSTONE ARSENAL RESEARCH LABS

Shown above is MG Charles W. Eifler presenting the AMC Award of Honor to Mr. Orville H. Loeffler, Manager of the Rohm Haas Redstone Arsenal Laboratories.

HUNTSVILLE DIVISION , THIOKOL CHEMICAL CORP. WINS AMC AWARD OF MERIT

Colonel J. N. Jean, Director of Arsenal Support Operations, is shown presenting the AMC Award of Merit for Safety to Mr. John H. Goodloe, Manager of the Huntsville Division, Thiokol Chemical Corporation. At Mr. Goodloe's side are Mr. Jack Harbarger, Manager of Plant Safety, and Mr. Gooch, Safety Engineer.

SPRINGFIELD ARMORY RECEIVES AMC AWARD OF HONOR

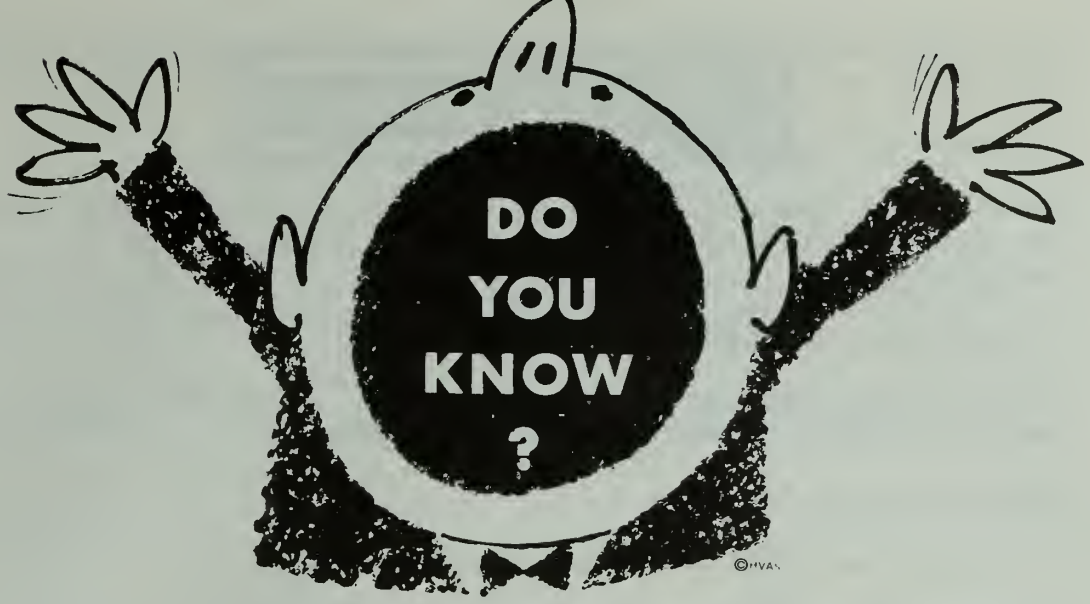
The Springfield Armory was presented recently with the AMC Award of Honor for Safety for FY 1967. Brigadier General W. J. Durrenberger (right), Commanding General, U. S. Army Weapons Command, is shown making the presentation to LTC Charles B. Zumwalt, Commanding Officer, Springfield Armory. John P. Devine, center, Armory Safety Director, looks on.

AMC FY 1967 AWARD OF MERIT WON BY U.S. ARMY PRODUCTION EQUIPMENT AGENCY

BG W. J. Woolwine, AMC Director, P&P, is shown presenting AMC Award of Merit for Safety to Mr. George Daniels, Director, USAPEA.

NSC AWARD OF HONOR WON BY USA ANNISTON AD

Col Burney, CO, and Mr. Gilmore, Safety Director, AAD are shown with the NSC Award of Honor. The Depot achieved 184 days without a disabling injury (former record 149 days established 18 years ago). Left in photo is Col (Ret) Creighton (Exec VP of Calhoun County (Ala) Safety Council) who presented the award. Mr. D. W. Gray, Calhoun County Commission Chairman is shown right in photo.



Here are ten questions that will test your knowledge of safety requirements that you will need under different circumstances. The answers to all of them may be found in AMCR 385-224. How many can you answer without referring to the regulation? The correct answers and references appear on pages 38 and 39

1. What is the meaning of the term explosionproof as used in connection with electrical equipment?

   Answer and reference:

2. What are the three types of approved lightning protection systems?

   Answer and reference:

3. Lead azide shall not be exposed to what other types of materials?

   Answer and reference:

4. What determines the distance required between two adjacent operating lines handling different explosives?

   Answer and reference:

5. Are openings allowed in substantial dividing walls for installation of conveyors?

   Answer and reference:

6. What is the minimum depth of earth cover to be maintained over magazines?

   Answer and reference:

7. What are the factors which determine the grouping of explosives and ammunition for compatibility?

   Answer and reference:

8. What daily inspections shall be made on Government-owned motor vehicles used for transportation of hazardous materiels?

   Answer and reference:

9. What is the minimum acceptable flash point of a safety solvent used for general cleaning purposes?

   Answer and reference:

10. For what may dust collecting systems be used?

    Answer and reference:

* * * *

PROSPECTIVE EMPLOYEE RECEIVES SAFETY MESSAGE

Safety education begins at the Louisiana Army Ammunition Plant with a large display case containing protective clothing and equipment, located in the lobby of the Employment Building. The display is very effective in attracting the prospective employees' attention to the safety centered atmosphere at LAAP. The high quality protective clothing and equipment gives prospective employees a conception of the importance placed on safety by Sperry Rand Corporation, the operating contractor.

This type of program creates a lasting impression. It could be used by any installation to attract attention to its safety program.

REFERENCE PUBLICATIONS

AR 385-26, 10 October 1967
Safety - Use of Explosives and Pyrotechnics in Public Demonstrations, Exhibitions and Celebrations

AR 700-64, December 1967
Radioactive Commodities in the DOD Supply Systems

AMCR 11-33, 6 October 1967
Army Programs, AMC Chemical and Biological Weapons Surety Program

AMCR 95-2, 13 October 1967
Aviation - Army Aviation - (One of the publications superseded by this regulation is AMCR 385-18. The new regulation contains the AMC Aircraft Accident Prevention Program.)

AMCR 385-1, C1, 18 September 1967
Safety - Safety Responsibilities

AMCR 385-12, 29 December 1967
Safety, Verification of Safety of Materiel From Development Through Testing, Production, and Supply to Disposition

AMCR 385-22, 28 September 1967
Safety - Chemical and Biological Accident and Injury Control

DA Cir 385-19, 4 December 1967
Safety - Dry Cleaning of Sleeping Bags

DA Pam 385-1, October 1967
Unit Safety Management

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LETTERKENNY AD COMMENDED FOR PERFECT RECORDS

Letterkenny AD has achieved 4,900,000 man-hours without a disabling injury from 3 June 1967 to 6 November 1967. This installation recently received a NSC Award of Honor for 4,600,000 man-hours without a disabling injury from 22 November 1966 to 5 May 1967. Installation personnel are commended for these outstanding safety records.

Here are the answers to the questions on pages 35 and 36 . All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer.

1. The term explosionproof as used in connection with electrical equipment means enclosed in a case which is capable of withstanding an explosion of a specified gas or vapor which may occur within it and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

   Reference: Paragraph 603d.

2. Approved lightning protection systems are the integrally mounted system, the separately mounted shielding system (mast type), and the separately mounted shielding system (overhead ground wire). Reference: Paragraph 802.

3. Lead azide shall not be exposed to copper, zinc or alloys containing such metals because of the possible formation of other azides which are more sensitive than the original lead azide. Reference: Paragraph 1403.

4. Where the explosives in adjacent operating lines differ, the lines shall be separated by inhabited building distances based on the explosive requiring the greater distance. Reference: Paragraph 1711a.

5. Openings in substantial dividing walls for installation of conveyors are not recommended. Where such openings are deemed necessary, the size shall not be larger than the minimum which will permit safe passage of the item being transferred. Reference: Paragraph 1723b.

6. The minimum depth of earth cover to be maintained over magazines shall not be less than two feet. Reference: Paragraph 1725a.

7. Explosives and ammunition are grouped for compatibility with respect to the following factors:

   a. Effects of explosion of the item,

   b. Rate of deterioration,

   c. Sensitivity to initiation,

   d. Type of packing,

   e. Effects of fire involving the item,

   f. Quantity of explosives per unit.

   Reference: Paragraph 1902.

8. Daily inspection shall be made to determine the following:

   a. Fire extinguishers are filled and in good working order;

   b. Electric wiring is in good condition and properly attached;

   c. Fuel tank and piping are secure and not leaking;

   d. Brakes, steering and other equipment are in good condition.

   Reference: Paragraph 2206.

9. For general cleaning purposes, a safety solvent having a flash point of 100°F. (37.8°C.) or above, should be used. Reference: Paragraph 928.

10. Dust collecting systems may be used to aid cleaning, to lessen explosion hazards, and to minimize industrial job-incurred poisoning and dermatitis. Reference: Paragraph 2705a.

SAFETY DIGEST INDEX

The January and March 1967 issues of the Safety Digest contained an index of articles published in Digests during the period of November 1962 through September 1966. The following index begins with the November 1966 issue and goes through November 1967.

Air and Gases

Toxicity of Gases in Rocket Exhausts - January 1967

Aircraft Safety

Aircraft Accident Prevention - January 1967

Army Lab Makes Progress Toward "Safe" Aviation Fuel - January 1967

An Improved Refueling System for Helicopters - May 1967

New Speed for Air Crash Rescue - July 1967

Explosives Safety

Reactivation and Maintenance of Explosives Equipment - November 1966

Flashing Failed to Prevent Explosion - November 1966

Testing Deflectors for Propagation Prevention - November 1966

Keep Standing Operating Procedures Up To Date - January 1967

Testing an Operational Shield - January 1967

Propellant and Hazardous Material - March 1967

Underground Storage of Small Lots of Hazardous Materials - May 1967

Should You Recheck Those Procedures? - May 1967

Three Explosives Operations Discrepancies to Correct - July 1967

Concurrent Operations - July 1967

The New Employee and Explosives - September 1967

Metal Forming with Explosives - September 1967

Recognition of Propellant Heat Sources - September 1967

Is Your SOP Understandable? - November 1967

Machines Add Safety to Initiating Explosives Processing - November 1967

Test Demonstrates Shield Adequacy - November 1967

Fire and Fire Fighting Equipment

Fire Fighting and Prevention Services - November 1966

Fire Prevention - November 1966

Fireproofing Christmas Trees - November 1966

Detrick Tests Soap Bubbles to Fight Fires - January 1967

Fire Fighting and Prevention Services - March 1967

Demonstrating Fusible Links and Dip Tanks - May 1967

Carbon Tetrachloride - May 1967

New Speed for Air Crash Rescue - July 1967

Know Your Fire Extinguishers - September 1967

Revised Fire Extinguishing Chart - September 1967

First, Install the Fire Protection - November 1967

Industrial Safety

Machine Guards Plus Common Sense Equal Safety - November 1966

The Extra Gas Can - November 1966

Emptying Electrolyte Solution from Industrial Storage Batteries - January 1967

Degreasing Hazards - January 1967

Proper Guarding Eliminates Hazard - January 1967

Safety Engineering in Equipment Design - January 1967

First Aid for Chemical Eye Injuries - January 1967

Applying Technical "Know-How" to Safety - March 1967

School for Forklift Operators - May 1967

Testing Chain Hoists and Chains - May 1967

Protective Equipment for Electrical Facilities - May 1967

Causes of Battery Explosions - July 1967

Let's Keep Our Fingers Intact - September 1967

Sharpe Safety Speeds Loading - September 1967

Forklift Truck Overhead Guards for Low Clearance - September 1967

Pinch Point Shielded - September 1967

Safety Harness Protects Student Climbers - September 1967

Making Work Safer

End Product Safety for Recoil Mechanisms - January 1967

Proper Guarding Eliminates Hazard - January 1967

Safety Engineering in Equipment Design - January 1967

Pile Driver Aids Cannon Safety, Saves Dollars for More Guns - January 1967

Metals and Chemical Safety

Chemical Safety for the Average Person - November 1966

First Aid for Chemical Eye Injuries - January 1967

A Hazardous Material Index - September 1967

Miscellaneous

Thirty Ways to Get Hurt in an Office - November 1966

The Case of the Misplaced Gas Lines - March 1967

Safety Slogans on Backs of Fire Symbols - March 1967

Acute Chloroquine-Primaquine and Dapsone Toxicity - May 1967

Railroad Accidents on the AMC Lines - September 1967

Here's to Your Good Health - September 1967

Motor Vehicle

Safety Hints for Motorcyclists - November 1966

Keep Your Eye on Your Tires - November 1966

Test Warning Signs - March 1967

Watch Where You're Backing - March 1967

Buckle Phase of Seat Belt Program - May 1967

Defensive Driving - July 1967

New Cumberland Army Depot Promotes Driving Safety - September 1967

Stopping Distances - November 1967

Motorcycle Accidents Increase - November 1967

Off-the-Job Safety

Bicycle Riders Come Out in the Spring - March 1967

Holiday Safety Demonstration - May 1967

Use Your Sunglasses Sensibly - May 1967

Learn to Inspect Motel Pools - July 1967

Off-the-Job Safety Program - July 1967

Radiation Safety

Failsafe Controls and Protective Systems - January 1967

Hot Line - July 1967

Safety Programming and Management

Contractor Employee Thinks of Safety - November 1966

Calculated Risks - November 1966

Ethics for the Safety Office - November 1966

The Road to Mission Safety-70 - March 1967

Fire, Radiation and Explosives Hazards Course at AMC Ammunition School, Savanna Army Depot - March 1967

Management Support is a Key to Safety - May 1967

AF Disciplinary Action for Safety Violation Sustained by U. S. Court of Claims - May 1967

School for Forklift Operators - May 1967

FY 1968 AMC Safety School Courses - July 1967

Why Supervisors Should Investigate Accidents - July 1967

Use Your Safety Know-How - July 1967

Off-the-Job Safety Program - July 1967

Count Your Safety Program Results - July 1967

Exercise More Safety Program Legs - July 1967

Off-Post Safety - Vietnam - July 1967

Do You Miss the Point in Near-Miss Accidents - July 1967

Eye Catcher Creates Contest Interest - July 1967

Management Inspection Team Produces **Safety** and Efficiency - November 1967

Make Your Safety Meetings Effective - November 1967

Testing and Proving Ground Safety

Test Warning Signs - March 1967

SHOE 'NUFF!
yes sir...

William A. "Bill" Daigger, OFMSER, was assigned to a forklift repair job on the ramp of a warehouse. He noted that the raising mast section of the lift was in a fixed position with the tines approximately 4 feet above the ramp surface. All attempts to lower the mast section by control had failed. Bill then checked the top part of the mast section to locate the trouble. After he learned that the hydraulic piston was jammed, he decided he would have to remove the mast cylinder bracket in order to free the piston. The location of the bracket made it necessary to climb on top of the overhead guard. In order to get close enough to remove the bolts from the cylinder bracket, he had to place one foot on the top of the mast section. He had removed all but one bolt and was in the process of loosening it when WHAM... BANG... the raised section of the mast had released and fallen. As it fell, the corner edge of the upper mast support bracket struck Bill's right foot. He was happy, oh so happy, for the safety toe cap had prevented almost sure amputation of two toes. Shoe enough? You bet!

As Bill put it: "Safety Shoes saved the day for W.A.!"

January 1968
Safety Office

Granite City Army Depot

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